

A NEW RECORD OF THE FAMILY PHRUROLITHIDAE Banks, 1982 (ARACHNIDA: ARANEAE) FROM INDIA

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ABSTRACT

The family Phrurolithidae Banks, 1982 is reported first time from India. The genus *Orthobula impressa* Simon, 1897 is described from the Lonar Crater Sanctuary, Dist-Buldhana, India. Diagnoses and illustrations with additional morphological characters of the species are presented.

Key words: Phrurolithinae, Corinnidae, *Orthobula impressa*, First record, Lonar Crater Sanctuary, India.

INTRODUCTION

The family Phrurolithidae Banks, 1992 recently elevated to family rank and delimited as part of the morphology and phylogeny of Dionychan spiders (Ramírez, 2014). It is currently represented by 188 species belonging to 14 genera worldwide (World Spider Catalogue, 2014). The family Phrurolithidae first time recorded from India. The Phrurolithids are hunting spiders living on the ground, and are found in leaf litter, woody debris or on the forest floor (Fu *et al.*, 2014).

The genus *Orthobula* Simon, 1897, it was placed Liocranidae for long time and transferred to Corinnidae (Bosselaers & Jocqué, 2002), it is currently placed in Phrurolithidae (Ramírez, 2014). It is a relatively a small genus with 17 species distributed in Africa and from the eastern Mediterranean to Taiwan (Marusik *et al.*, 2013). These species are found in some islands and countries of the Ethiopian, Oriental and Palearctic regions (Deeleman-Reinhold, 2001; Mikhailov and Fet, 1994). In the genus *Orthobula* Simon, 1897 includes *O. bilobata* (Deeleman-Reinhold, 2001), *O. calceata* (Simon, 1897), *O. charitonovi* (Mikhailov, 1986), *O. crucifera* (Bösenberg & Strand, 1906), *O. impressa* (Simon, 1897), *O. infima* (Simon, 1896), *O. milloti* (Caporiacco, 1949), *O. pura* (Deeleman-Reinhold, 2001), *O. quadrinotata* (Deeleman-Reinhold, 2001), *O. radiata* (Simon, 1897), *O. sicca* (Simon, 1903), *O. spiniformis* (Tso *et al.*, 2005), *O. trinotata* (Simon, 1896), *O. yaginumai* (Platnick, 1977). Three species from Tibet described in *Orthobula* (*O. qinghaiensis* Hu, 2001, *O. tibensis* Hu, 2001, and *O. zhangmuensis* Hu & Li, 1987) are misplaced (Platnick, 2013; personal observation of Y.M.; Marusik *et al.*, 2013).

The Lonar is Third largest Crater in the world. This was formed 50-60 million years ago by meteoritic impact on basalt rock. The Present paper deals with specimens collected as part of DST funded Project entitled “Natural History and Systematics of Spiders from Lonar Crater Sanctuary”; the genus *Orthobula impressa* Simon, 1897 was described and illustrated.

MATERIALS AND METHODS

The present study is based on material collected in 2012 and 2013 from the Lonar Crater Sanctuary. A total 8 specimens (5 male, 2 female and 1 juvenile) were collected. The specimens were captured through pitfall traps, lifting leaf litter and hand picking. The spiders were identified by using the book “Forest spiders of South East Asia” (Deeleman-Reinhold 2001). The basic identification of specimens was made by a Carl-Zeiss Stemi 2000-c Stereo-Zoom microscope mounted with AxioCam ERc5s camera (Germany). All specimens were preserved in 70% ethanol and currently deposited in the Arachnology Research Centre of J.D.P.S.M, Daryapur. All measurements are in millimeters and abbreviations in the text: AME-anterior median eyes; ALE-anterior lateral eyes; PME-posterior median eyes; PLE-posterior lateral eyes; MOA-median ocular area.

Taxonomy

Family Phrurolithidae Banks, 1982

Phrurolithi Banks, 1892: 94. Type genus: Phrurolithus C.L. Koch, 1839.

Diagnosis: Phrurolithids are similar to trachelids in having claw tufts made of heavily folded setae, a claw tuft clasper and reduced leg spination especially on posterior legs and dorsally on all femora, and lacking a median apophysis on the male copulatory bulb, but can be distinguished by having modifications on the ventral side of the male palpal femur, especially a ventral median apophysis and usually a ventral apical hook. All phrurolithids except *Drasinella* have a characteristic globose receptacle on the female internal genitalia, in addition to the primary and secondary spermathecae. Phrurolithids differ from most trachelids by having a long series of ventral macrosetae on the anterior tibiae, and by lacking cusples (Ramírez, 2014).

Genus *Orthobula* Simon, 1897

Orthobula Simon, 1897: 152, Type species: *Orthobula impressa* Simon, 1897

Diagnosis: The genus *Orthobula* is distinct from other Phrurolithids by their members having a reduced thoracic groove, the sternum rebordered, a femora without

spines, and the tibiae and metatarsi having anterior ventral spines. The male palp is expanded with a slightly sclerotized tegulum, simple bulb, and lacking additional apophysis. In the male, a fully covered scutum is present dorsally over its full length; ventrally there is an epigastric scutum and partial post-genital scutum. The dorsal scutum and post-genital ventral scutum are absent in the female. The epigastric scutum consists of a central epigynal plate and separate lateral plates. The epigynum is with a pair of rod-shaped spermathecae near the epigastric fold, and a pair of membranous sacs attached to the connecting duct, and there are intromittent orifices located at anterior parts.(Deeleman-Reinhold 2001)

***Orthobula impressa* Simon, 1897 (fig.1-18)**

Material examined: 5 male, 1 female and 1 juvenile from Lonar Crater Sanctuary, Maharashtra, India ($19^{\circ} 58' 363''$ N, $76^{\circ} 30' 303''$ E), 12-12-2012, Collected by S.V. Manthen (ARC JDPSM); 1 female from Lonar Crater Sanctuary, Maharashtra, India, 31-05-2013, Collected by S.V. Manthen (ARC JDPSM).

Distribution: Lonar Crater Sanctuary, District-Buldhana (MS), India, Sri Lanka and Seychelles,

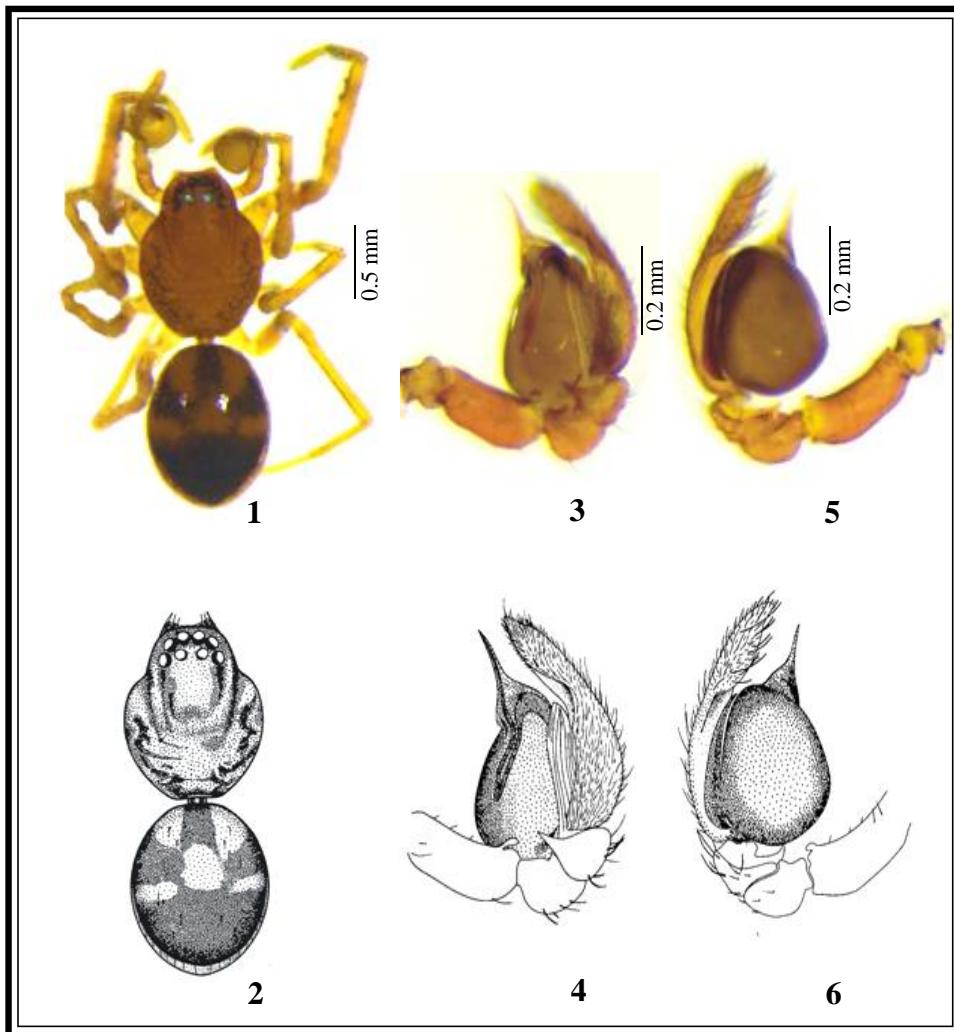
Diagnosis: The *Orthobula impressa* Simon, 1897, distinct from other congeners by the diverging and dark insemination ducts, a curved copulatory opening, the secondary spermathecae posteriorly with a pair of large membranous sacs attached in the middle with its base large, triangular and sclerotized (fig 9-12). This species distinguished by tibia having long triangular retrolateral apophysis, the cymbium with a spine at the apex, and the bulb with a closely looped retrolateral duct or U-shaped duct and long pointed embolus (fig 3-6). The male of *O. impressa* differs from the other species by its tibiae I with 6 prolateral and 5 retrolateral ventral spines, tibiae II with 5 prolateral and 4 retrolateral ventral spines. Metatarsi I and II with 4 pairs of ventral spines. Tarsus I and II with 3 pairs of ventral spines. (fig 15) In female tibiae I with 7 prolateral and 6 retrolateral ventral spines. Tibiae II with 6 prolateral and 5 retrolateral ventral spines. Metatarsus I and II with 4 pairs of ventral spines, tarsus I and II with 3 pairs of ventral spines. (fig 18)

Description: Male. Total length 2.17; cephalothorax 1.04 long, 0.85 wide; abdomen 1.06 long, 0.82 wide. Carapace yellowish brown, partially covered with numerous pits and blackish brown stripes laterally;- presence of numerous hairs. Thoracic portion with several teeth on each side. Eyes in two rows, anterior eye row recurved, and posterior eye row slightly recurved. AME 0.07, ALE 0.07, PME 0.06, PLE 0.06, MOA 0.05 long, frontal width 0.02, back width 0.05.

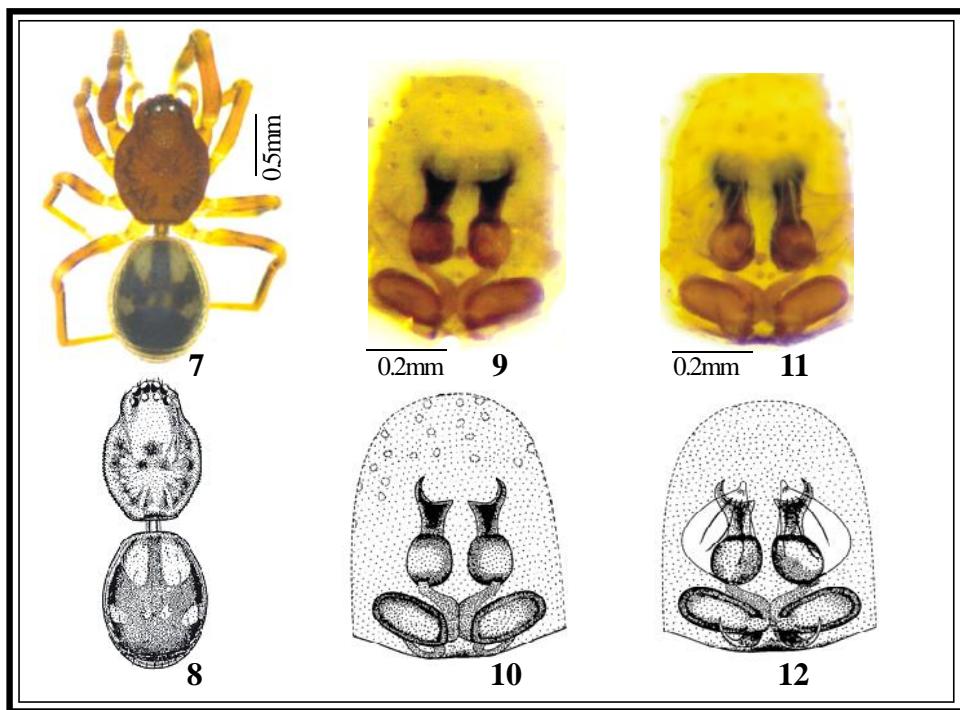
Chelicerae yellowish brown, with 3 teeth on promargin and 2 on retromargin, the row of long plumose hairs on either side of fang forming hair basket (Fig 17). Labium brownish, wider than long, invaginated opposite basal lobe of endites, with two spines at truncate apex. Endites yellowish brown, triangular with scopulae on either promargin of chelicerae.

Table 1. Leg measurements of *Orthobula impressa* Simon, 1897 (male/female)

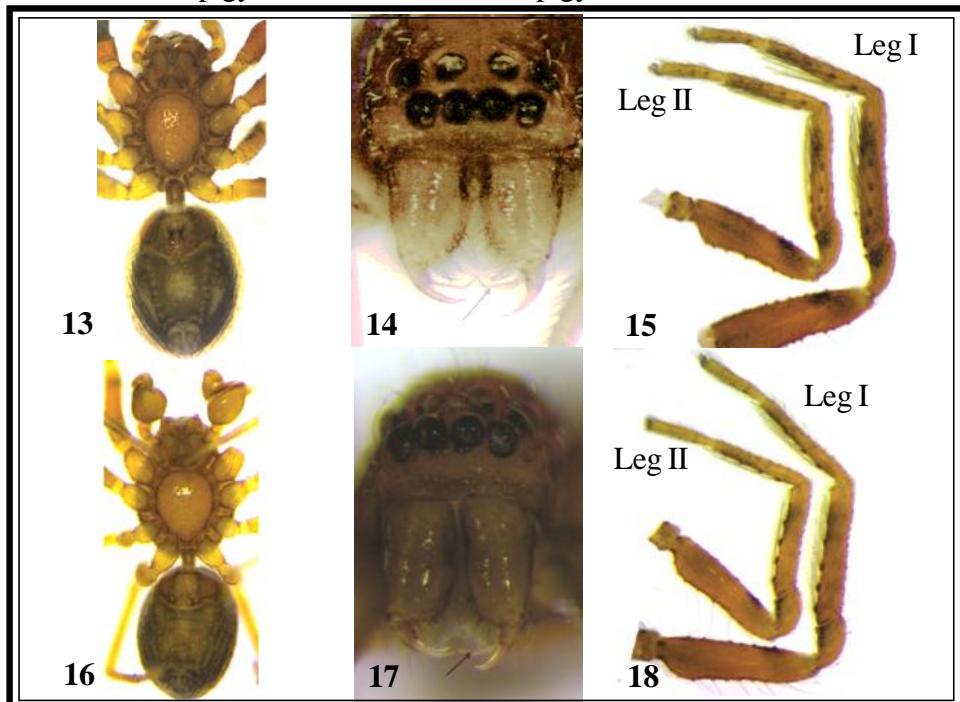
Legs	Coxa	Trochanter	Femur	Patella	Tibia	Metatarsus	Tarsus	Total Length
I	0.30/	0.10/	0.68/	0.22/	0.59/	0.49/	0.30/	2.68/
	0.31	0.10	0.74	0.26	0.64	0.54	0.33	2.92
II	0.23/	0.09/	0.58/	0.21/	0.46/	0.41/	0.29/	2.27/
	0.23	0.10	0.63	0.23	0.50	0.46	0.35	2.46
III	0.20/	0.09/	0.53/	0.20/	0.40/	0.43/	0.21/	2.06/
	0.22	0.10	0.60	0.23	0.47	0.47	0.35	2.44
IV	0.27/	0.11/	0.71/	0.22/	0.64/	0.63/	0.38/	2.96/
	0.28	0.12	0.81	0.26	0.70	0.72	0.43	3.32



Figs 1-6. *Orthobula impressa* Simon, 1897., 1-2, Male: dorsal view; 3-4 left palp, retrolateral view; 5-6 left palp, ventral view .



Figs 7-12. *Orthobula impressa* Simon, 1897., 7-8 Female: dorsal view; 9-10 epigyne, dorsal view; 11-12 epigyne, ventral view.



Figs 13-18. *Orthobula impressa* Simon, 1897., 13, Female: ventral view, 14, cheliceral frontal view showing basket hairs, 15, female Leg I, II, prolateral view; 16, Male: ventral view, 17, cheliceral frontal view showing basket hairs, 18, leg I, II, prolateral view.

Sternum yellowish brown, strongly rebordered, longer than wide, with dark brown margins and evenly distributed pits (Fig 16).

Legs yellowish brown. Tibiae I with 6 prolateral and 5 retrolateral ventral spines, tibiae II with 5 prolateral and 4 retrolateral ventral spines. Metatarsi I and II with 4 pairs of ventral spines Tarsus I and II with 3 pairs of ventral spines (Fig 18). Trichobothria present.

Abdomen covered with a scutum over the full length dorsally and ventrally with an epigastric scutum; dorsum blackish brown, with a few yellowish brown patches, ventral abdomen grayish brown. Leg formula: 4123. Legs measurements are given in Table 1. Palp total length 1.15 (0.10, 0.27, 0.16, 0.11, 0.51). Papal femur with small ventral apophysis distally, patella and tibia short, having setae; tibia with a long triangular retrolateral apophysis with spines, cymbium long narrow and having numerous hairs, bulb globose and triangular with closely looped retrolateral duct or U-shaped duct and long pointed embolus (Fig. 3-6).

Female. Total length 2.65; cephalothorax 1.26 long, 0.96 wide; abdomen 1.26 long, 1.04 wide. Dorsum of abdomen grayish brown, lacking dorsal scutum, with two pairs of yellowish brown sigilla. Legs yellowish brown. Tibiae I with 7 prolateral and 6 retrolateral ventral spines. Tibiae II with 6 prolateral and 5 retrolateral ventral spines. Metatarsus I and II with 4 pairs of ventral spines. Tarsus I and II with 3 pairs of ventral spines (Fig 15). AME 0.08, ALE 0.07, PME 0.07, PLE 0.07, MOA 0.05 long, front width 0.02, back width 0.05. Other characters as in male. Leg formula: 4123. Leg measurements are given in Table 1. Palp total length 0.77 (0.06, 0.18, 0.10, 0.15, 0.28).

Epigynum almost quadrate; attached diverging insemination ducts and dark, curved copulatory opening, vulva with a pair of spermathecae, primary spermathecae oval, secondary spermathecae large and posteriorly with a pair of large membranous sacs attached in the middle with its base large, triangular and sclerotized (Fig 9-12).

Ecology & Habitat: Species of *Orthobula* have been found in humid rainforest, dry steppes and deserts (Deeleman-Reinhold, 2001, Dani man *et al.*, 2012). In our study most specimens were found in pitfall traps & under leaf litter on the ground.

DISCUSSION

The present investigation shows that the description of morphometric measurement and other features are distinct from other common species. The little change occurs in morphological characters like colour, size, spines on legs of tarsus and insemination ducts, but generally Simon's description is similar to ours.

ACKNOWLEDGEMENTS

We are very grateful to Science and Engineering Research Board (SERB), Department of Science and Technology (DST), New Delhi, for financial support (SR/FT/LS-08/2011). We would like to thank the Principal Chief Conservator of Forests (Wildlife) & Chief Wildlife Warden, Nagpur & Maharashtra State Biodiversity Board (MSBB), Nagpur, for providing the necessary permission for conducting this investigation. We are very grateful to Dr. N.I. Platnick, Former Emeritus Curator, AMNH for providing important comments on the manuscript. We are sincerely acknowledged to Yuri Marusik, Institute of Biological Problem of the North RAS, Russia. We are also thankful to Dr. G.N. Vankhede, Dr. V.P. Uniyal and Dr. Melek Erdek for suggestions during this research. Our sincere thanks to Dr.S.S. Deshmukh, Principal J.D.P.S.M, Daryapur for providing necessary facilities/ support this for research work.

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